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Remarks

Applicants and their representatives wish to thank Examiner Trinh for the thorough examination of the present application and the detailed explanations in the Office Action dated August 27, 2007. Claims 165-205 have been added, Claims 45, 102, 120, and 151 have been canceled, and Claims 41, 43, 51, 56, 57, 59, 62, 103-105, 110-111, 113-114, 117, 121-123, 126, 131-133, 145, 147, and 153-154 have been amended. Therefore, Claims 41, 43-44, 46, 51, 53-54, 56-65, 96-101, 103-119, 121-150, and 152-203 are active in the present application.

The Rejection of Claims 41, 43-46, 56-65, 111-112, 125 and 160-164 under 35 U.S.C. § 103(a)

The rejection of Claims 41, 43-46, 56-65, 111-112, 125, and 160-164 under 35 U.S.C. § 103(a) as being unpatentable over Shiho et al., U.S. Patent Application Serial No. 2003/0045632 (hereinafter "Shiho") taken with Jacobson et al., U.S. Patent Nos. 6,294,401 (hereinafter "Jacobson '401") and 6,200,508 (hereinafter "Jacobson '508") and Kim et al., U.S. Patent No. 6,355,198 (hereinafter "Kim") is respectfully traversed.

Shiho discloses a method for making a silane composition for preparing a semiconductor thin film of a solar cell, in which the silane composition contains a polysilane compound and at least one silane compound selected from cyclopentasilane, cyclohexasilane, and silylcyclopentasilane (Abstract). In addition, Shiho discloses forming a silicon film on a substrate by forming the coating film of a silane composition on the substrate by means such as spray coating, roll coating, curtain coating, spin coating, screen printing, offset printing or ink jet printing (page 7, paragraphs [0106] and [0110]).

However, Shiho is silent with regard to making a patterned semiconducting film by gravure printing or flexographic printing a solution containing semiconductor nanoparticles and cyclic Group IVA compound. In addition, Shiho does not affirmatively disclose printing by offset lithography, as recited in Claim 41. Although Shiho discloses forming a silane composition on a substrate using an offset printing technique, it is understood by Applicant's undersigned representative that offset printing does not require lithography. Therefore, Shiho

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disclosure does not disclose, inherently or explicitly, printing by offset lithography. Thus, Shiho is saliently deficient with regard to Claim 41.

Furthermore, Shiho is silent with regard to printing a solution comprising passivated semiconductor nanoparticles and *at least one cyclogermane or cyclosilagermane*. The USPTO considers compounds containing silicon and compounds containing germanium to be patentably distinct.^{1,2} As a result, Shiho does not disclose or suggest making a patterned semiconducting film by printing a solution comprising passivated semiconducting nanoparticles and *at least one cyclogermane or cyclosilagermane*, as recited in new independent Claim 166. Thus, Shiho is deficient with regard to new Claim 166. The remaining cited references fail to cure the deficiencies of Shiho with regard to Claims 41 and 166.

Jacobson '401 discloses a method for making electronic, chemical, and mechanical devices by deposition and patterning nanoparticles through printing technology (Abstract). In addition, Jacobson '401 discloses a method for depositing and patterning nanoparticles suspended in liquid onto a substrate using a wide variety of processes, including ink jetting, spincoating, casting, lithography, gravure printing, screen printing, impact printing, stamping, contact printing (whereby a liquid or solid pattern is transferred from a plate, stamp or cylinder), or transfer onto the substrate through a mask (col. 5, ll. 34-40).

However, Jacobson '401 is silent with regard to making a patterned semiconductor film by flexographic printing a solution containing semiconductor nanoparticles and cyclic Group IVA compound, as recited in Claim 41. Furthermore, Jacobson '401 does not affirmatively disclose printing by offset lithography, as recited in Claim 41. Although Jacobson '401 disclose depositing and patterning nanoparticles suspended in liquid onto a substrate using a variety of processes, including lithography, lithography is a relatively broad term and does not necessarily suggest printing by offset lithography to one of ordinary skill in the art. For example, optical

¹ See page 2, paragraph 2, of the Office Action dated December 18, 2007 in Application No. 10/789,317 (Attorney Docket No. IDR0020), requiring an election between species of Group IVA elements (submitted herewith).

² See page 2, paragraph 2, of the Office Action dated January 3, 2008 in Application No. 10/789,274 (Attorney Docket No. IDR0080), constructively electing claims reciting a silane and withdrawing claims reciting compounds comprising Si and Ge (submitted herewith; emphasis in original).

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lithography is a common technique for making patterns on integrated circuits, but it does not appear to be immediately applicable to offset printing, as disclosed by Jacobson '401 (see Wolf et. al., *Silicon Processing For The VLSI ERA*, Vol. 1, Second Edition, 2000, Lattice Press, pp. xviii-xxi, 488, and 545, submitted herewith). Therefore, Jacobson '401 does not disclose, inherently or explicitly, printing by offset lithography.

Finally, although Jacobson '401 discloses (among a variety of printing methods), including gravure printing of nanoparticles suspended in liquid, Jacobson '401 fails to disclose printing an ink that comprises a cyclic Group IVA compound. One of ordinary skill in the art would not necessarily expect that gravure printing an ink containing a cyclic Group IVA compound and semiconducting particles would be successful based on Jacobson's deposition and patterning of nanoparticle inks because certain properties of cyclic Group IVA compounds, such as volatility, viscosity, and surface tension, might have been expected to render the ink unsuitable for gravure printing applications. As a result, Jacobson '401 does not necessarily suggest gravure printing a solution comprising passivated semiconductor nanoparticles and a cyclic Group IVA compound, as recited in Claim 41.

With regards to new Claim 166, Jacobson '401 fails to disclose printing a solution comprising passivated semiconductor nanoparticles and *at least one cyclogermane or cyclosilagermane*, as recited in Claim 166. As discussed above, the USPTO considers compounds containing silicon and compounds containing germanium to be patentably distinct. Thus, Jacobson '401 fails to cure the deficiencies of Shiho with regard to Claims 41 and 166.

Jacobson '508 discloses a method of utilizing printing techniques to build three dimensional structures by depositing successive layers of a device onto a substrate (Abstract). Additionally, Jacobson '508 discloses a method employing a conventional ink jet technique to accomplish depositing the successive layers onto a substrate to build three dimensional structures, such as miniature switches, motors, and the like (col. 1 ll. 16 and 33-45). Furthermore, Jacobson '508 discloses a method of depositing an ink comprising particles that may consist of such materials as silicon, germanium, GaAs, or other suitable semiconductive materials in a vehicle, in which the vehicle may be a vinyl or other resin that is heat curable or

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UV curable or any other suitable binder known in the art of electrically conducting inks (col. 2, ll. 31-35 and 44-46, and FIG. 1A).

However, Jacobson '508 is silent with regard to making a patterned semiconductor film by flexographic printing, printing by offset lithography, or gravure printing a solution containing semiconductor nanoparticles and a cyclic Group IVA compound, as recited in Claim 41.

In addition, Jacobson '508 fails to disclose printing a solution comprising passivated semiconductor nanoparticles and at least one cyclogermane or cyclosilagermane, as recited in Claim 166. Thus, Jacobson '508 fails to cure the deficiencies of Shiho and Jacobson '401 with regard to Claims 41 and 166.

Kim discloses a method for patterning chemically or biochemically active agents or other species on a substrate surface by providing a micro-mold having a contoured surface and forming, on a substrate surface, a chemically or biochemically active agent or fluid precursor of a structure (Abstract). Additionally, Kim discloses a method for forming waveguides having a width about 2-4 microns, a waveguide height about 1 micron, and a wide variety of lengths from 100 microns to centimeters (col. 34, ll. 16-26 and FIG. 1).

However, Kim does not disclose a method for making a patterned semiconducting film by gravure printing, printing by offset lithography, or flexographic printing a solution containing semiconductor nanoparticles and a cyclic Group IVA compound, as recited in Claim 41. Furthermore, Kim is silent with regard to printing a solution comprising passivated semiconductor nanoparticles and *at least one cyclogermane or cyclosilagermane*, as recited in Claim 166. Thus, Kim fails to cure all the deficiencies of Shiho, Jacobson '401, and Jacobson '508 with regard to Claims 41 and 166.

Therefore, Claims 43-46, 56-65, 111-112, 125, and 160-164 depend on Claim 41, therefore include all of its limitations. Consequently, this ground of rejection is unsustainable, and should be withdrawn.

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The Rejection of Claims 51 and 53-54 under 35 U.S.C. § 103(a)

The rejection of Claims 51 and 53-54 under 35 U.S.C. § 103(a) as being unpatentable over Shiho, Jacobson '401 and '508, and Kim, as applied to Claims 41-46, 56-65, 111-112, 125, and 160-164 above, and further of Tani et al., U.S. Patent No. 5,254,439 (hereinafter "Tani"), is respectfully traversed.

As discussed above, Shiho, Jacobson '401 and '508, and Kim are deficient with regard to making a patterned semiconductor film by gravure printing, printing by offset lithography, or flexographic printing a solution containing semiconductor nanoparticles and a cyclic Group IVA compound, as recited in Claim 41. Furthermore, Shiho, Jacobson '401 and '508, and Kim are deficient with regard to making a patterned semiconductor by printing a solution comprising passivated nanoparticles and *at least one cyclogermane or cyclosilagermane*, as recited in Claim 166. Tani fails to cure the deficiencies of Shiho, Jacobson '401 and '508 with regard to Claims 41 and 166.

Tani discloses a method for preparing a polymer having linear -Si-O-Si- bonds and -Si-Si- bonds, or polysilane bonds that are greater than trisilane bonds under oxidation with oxygen plasma to form SiO₂ resistant to oxygen dry etching, that is sensitive to far ultraviolet rays and suitable as a single layered resist or an upper resist of a two-layered system (Abstract). Furthermore, Tani discloses a method for forming a resist pattern using the previously mentioned polymer by selectively irradiating an upper resist layer (3) with pulses of KrF excimer laser rays (4) through a mask carrying a desired pattern (col. 6, ll. 16-20 and FIG. 2(c)).

However, Tani fails to disclose making a patterned semiconductor film by gravure printing, printing by offset lithography, or flexographic printing a solution, as recited in Claim 41. Furthermore, Tani does not suggest or disclose a printing a solution comprising passivated nanoparticle and *at least one cyclogermane or cyclosilagermane*, as recited in Claim 166.

As a result, Tani fails to cure all the deficiencies of Shiho, Jacobson '401 and '508, and Kim with regard to Claims 41 and 166. Claims 51, 53-54 are dependent on Claim 41 and

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therefore include all of its limitations. Consequently, this ground of rejection is unsustainable, and should be withdrawn.

The Rejection of Claims 135-138 under 35 U.S.C. § 103(a)

The rejection of Claims 135-138 under 35 U.S.C. § 103(a) as being unpatentable over Shiho, Jacobson '401 and '508, and Kim, as applied to Claims 41-46, 56-65, 111-112, 125, and 160-164 above, and further view of Korgel, U.S. Patent Application Serial No. 2003/0034486 (hereinafter "Korgel"), is respectfully traversed.

As discussed above, Shiho, Jacobson '401 and '508, and Kim are deficient with regard to a method of making a patterned semiconductor film by gravure printing, printing by offset lithography, or flexographic printing a solution containing semiconductor nanoparticles and a cyclic Group IVA compound, as recited in Claim 41. Furthermore, Shiho, Jacobson '401 and '508, and Kim do not suggest or disclose making a patterned semiconductor film by printing a solution comprising passivated nanoparticle and *at least one cyclogermane or cyclosilagermane*, as recited in Claim 166. Korgel fails to cure the deficiencies of Shiho, Jacobson '401 and '508, and Kim with regards to Claims 41 and 166.

Korgel discloses a method for production of a robust, chemically stable, crystalline, passivated nanoparticle and composition containing the same, that emits light with high efficiencies and size-tunable and excitation energy tunable color (Abstract). In addition, Korgel discloses a method of forming nanocrystalline or amorphous particles, having an average diameter of between about 1 to about 100 Å from Group IV metals, by the thermal degradation of a precursor molecule in the presence of molecules that bind to the particle surface, referred to as a capping agent at high temperature and elevated pressure (page 1, paragraph [0010] and page 3, paragraph [0032]).

However, Korgel is silent with regard to making a patterned semiconductor film by gravure printing, printing by offset lithography, or flexographic printing a solution containing semiconductor nanoparticles and a cyclic Group IVA compound, as recited in Claim 41. In

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addition, Korgel fails to disclose printing a solution comprising passivated semiconductor nanoparticles and *at least one cyclogermane or cyclosilagermane*, as recited in Claim 166. Thus, Korgel fails to cure all of the deficiencies of Shiho, Jacobson '401 and '508, and Kim with regard to Claims 41 and 166. Claims 135-138 are dependent on Claim 41 and therefore includes all of its limitations. Consequently, this ground of rejection is unsustainable, and should be withdrawn.

Conclusions

In view of the above amendments and remarks, all bases for objection and rejection are believed to be overcome, and the application is believed to be in condition for allowance. Early notice to that effect is earnestly requested.

If it is deemed helpful or beneficial to the efficient prosecution of the present application, the Examiner is invited to contact Applicant's undersigned representative by telephone.

Respectfully submitted,



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